

## SEQUENCE LISTING

5

## (1) GENERAL INFORMATION:

- (i) APPLICANT: Sato, Takaaki
- 10 (ii) TITLE OF INVENTION: TREX, A NOVEL GENE OF TRAF-INTERACTING  
EXT GENE FAMILY AND DIAGNOSTIC AND THERAPEUTIC USES  
THEREOF
- (iii) NUMBER OF SEQUENCES: 37
- 15 (iv) CORRESPONDENCE ADDRESS:  
(A) ADDRESSEE: Cooper & Dunham LLP  
(B) STREET: 1185 Avenue of the Americas  
(C) CITY: New York  
20 (D) STATE: New York  
(E) COUNTRY: U.S.A  
(F) ZIP: 10036
- (v) COMPUTER READABLE FORM:  
25 (A) MEDIUM TYPE: Floppy disk  
(B) COMPUTER: IBM PC compatible  
(C) OPERATING SYSTEM: PC-DOS/MS-DOS  
(D) SOFTWARE: PatentIn Release #1.0, Version #1.30
- 30 (vi) CURRENT APPLICATION DATA:  
(A) APPLICATION NUMBER:  
(B) FILING DATE:  
(C) CLASSIFICATION:
- 35 (viii) ATTORNEY/AGENT INFORMATION:  
(A) NAME: White, John P.  
(B) REGISTRATION NUMBER: 28,678  
(C) REFERENCE/DOCKET NUMBER: 0575/51902-A-PCT
- 40 (ix) TELECOMMUNICATION INFORMATION:  
(A) TELEPHONE: (212) 278-0400  
(B) TELEFAX: (212) 391-0525

## 45 (2) INFORMATION FOR SEQ ID NO:1:

- (i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 3479 base pairs  
(B) TYPE: nucleic acid  
50 (C) STRANDEDNESS: single  
(D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: DNA (genomic)
- 55 (ix) FEATURE:  
(A) NAME/KEY: CDS  
(B) LOCATION: 458..3211
- 60 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:1:

|    |   |            |            |            |                         |                 |      |
|----|---|------------|------------|------------|-------------------------|-----------------|------|
|    | CCTGATCGTT  | GGTAGTGGCA | TGGAGGACGG | GGCTGGCATT | TCAGACTGCC              | AGCTGTTTTT      | 60   |
|    | ACCAGCCGCT  | GCATCACTTG | AATAGAAGCT | ATGCATATTG | GCTGGCCGAC              | AAAGCCAAGG      | 120  |
|    | 5GACAAAAGCT   | ATGGCCGTTA | AAATGGTCCC | TCTGAGTCCA | GGGCTCTTTC              | CCTGGCTTTT      | 180  |
|    | AGCACCATGG  | ATCTCTTCCT | TTTCATCCCA | TCAGCAATGT | GGTACCTTCT              | TCTACTTGAT      | 240  |
|    | GATGACAGCT  | GATACTTCAG | ATTTGCCTGA | CTAAGGTTAG | AAACCTGAAT              | CGCTGTGAGG      | 300  |
| 10 | AAGATGAAAT  | TTCCATTTTA | CTTGGTGCCT | TGTGCAGGGA | GCACACTGAT              | CCTTCCAGAA      | 360  |
|    | ACTTGTGTGT  | GAAAAGAGGT | TGCGTTTTGT | CAGACAGACT | CATGGTTATG              | GCGAGCGATC      | 420  |
| 15 | CGACGTGATC  | AGAGTGGGCA | AGAGGCACAG | CGAACTC    | ATG ACA                 | GGC TAT ACC ATG | 475  |
|    |   |            |            |            | Met Thr Gly Tyr Thr Met |                 |      |
|    |   |            |            |            | 1                       | 5               |      |
|    | TTG CGG AAT GGG GGA GTG GGG AAC GGT GGT CAG ACC TGT ATG CTG CGC |            |            |            |                         |                 | 523  |
| 20 | Leu Arg Asn Gly Gly Val Gly Asn Gly Gly Gln Thr Cys Met Leu Arg |            |            |            |                         |                 |      |
|    |   | 10         |            |            |                         |                 | 20   |
|    | TGG TCC AAT CGC ATC CGG CTG ACA TGG CTG AGT TTC ACG CTG TTC ATC |            |            |            |                         |                 | 571  |
| 25 | Trp Ser Asn Arg Ile Arg Leu Thr Trp Leu Ser Phe Thr Leu Phe Ile |            |            |            |                         |                 |      |
|    |   | 25         |            |            |                         |                 | 35   |
|    | ATC CTC GTC TTC TTC CCC CTC ATT GCT CAC TAT TAC CTC ACC ACT CTG |            |            |            |                         |                 | 619  |
| 30 | Ile Leu Val Phe Phe Pro Leu Ile Ala His Tyr Tyr Leu Thr Thr Leu |            |            |            |                         |                 |      |
|    |   | 40         |            |            |                         |                 | 50   |
|    | GAC GAG GCA GAC GAG GCT GGC AAG CGC ATC TTC GGC CCT CGG GCT GGC |            |            |            |                         |                 | 667  |
|    | Asp Glu Ala Asp Glu Ala Gly Lys Arg Ile Phe Gly Pro Arg Ala Gly |            |            |            |                         |                 |      |
|    |   | 55         |            |            |                         |                 | 65   |
|    | AGT GAG CTC TGT GAG GTA AAG CAT GTC CTT GAT CTC TGT CGG ATT CGT |            |            |            |                         |                 | 715  |
| 35 | Ser Glu Leu Cys Glu Val Lys His Val Leu Asp Leu Cys Arg Ile Arg |            |            |            |                         |                 |      |
|    |   |            | 75         |            |                         |                 | 80   |
|    | GAG TCT GTG AGC GAA GAG CTT CTA CAG CTC GAA GCC AAG CGG CAG GAG |            |            |            |                         |                 | 763  |
| 40 | Glu Ser Val Ser Glu Glu Leu Leu Gln Leu Glu Ala Lys Arg Gln Glu |            |            |            |                         |                 |      |
|    |   | 90         |            |            |                         |                 | 95   |
|    | CTG AAC AGC GAG ATT GCC AAG CTG AAC CTC AAG ATT GAA GCC TGT AAG |            |            |            |                         |                 | 811  |
| 45 | Leu Asn Ser Glu Ile Ala Lys Leu Asn Leu Lys Ile Glu Ala Cys Lys |            |            |            |                         |                 |      |
|    |   | 105        |            |            |                         |                 | 110  |
|    | AAG AGC ATA GAG AAT GCC AAG CAG GAC CTG CTG CAG CTC AAG AAT GTC |            |            |            |                         |                 | 859  |
|    | Lys Ser Ile Glu Asn Ala Lys Gln Asp Leu Leu Gln Leu Lys Asn Val |            |            |            |                         |                 |      |
|    |   | 120        |            |            |                         |                 | 125  |
| 50 | ATT AGC CAG ACA GAG CAC TCC TAC AAG GAG CTG ATG GCC CAG AAC CAG |            |            |            |                         |                 | 907  |
|    | Ile Ser Gln Thr Glu His Ser Tyr Lys Glu Leu Met Ala Gln Asn Gln |            |            |            |                         |                 |      |
|    |   |            |            |            |                         |                 | 135  |
|    | CCC AAA CTG TCC CTG CCC ATC CGA CTG CTC CCT GAG AAG GAC GAT GCC |            |            |            |                         |                 | 955  |
| 55 | Pro Lys Leu Ser Leu Pro Ile Arg Leu Leu Pro Glu Lys Asp Asp Ala |            |            |            |                         |                 |      |
|    |   |            | 155        |            |                         |                 | 160  |
|    | GGC CTT CCA CCC CCC AAG GTC ACT CGG GGT TGC CGC CTT CAC AAC TGC |            |            |            |                         |                 | 1003 |
| 60 | Gly Leu Pro Pro Pro Lys Val Thr Arg Gly Cys Arg Leu His Asn Cys |            |            |            |                         |                 |      |
|    |   |            | 170        |            |                         |                 | 175  |
|    | TTT GAT TAC TCT CGT TGT CCT CTG ACG TCT GGC TTT CCC GTC TAC GTC |            |            |            |                         |                 | 1051 |

Phe Asp Tyr Ser Arg Cys Pro Leu Thr Ser Gly Phe Pro Val Tyr Val  
 185 190 195

TAT GAC AGT GAC CAG TTT GCC TTT GGG AGC TAC CTG GAC CCT TTG GTC 1099  
 5Tyr Asp Ser Asp Gln Phe Ala Phe Gly Ser Tyr Leu Asp Pro Leu Val  
 200 205 210

AAG CAG GCT TTT CAG GCT ACA GTG AGA GCC AAC GTT TAT GTT ACA GAA 1147  
 Lys Gln Ala Phe Gln Ala Thr Val Arg Ala Asn Val Tyr Val Thr Glu  
 10215 220 225 230

AAT GCG GCC ATC GCC TGC CTG TAT GTG GTG TTA GTG GGA GAA ATG CAA 1195  
 Asn Ala Ala Ile Ala Cys Leu Tyr Val Val Leu Val Gly Glu Met Gln  
 235 240 245

15  
 GAG CCC ACT GTG CTG CGG CCT GCC GAC CTT GAA AAG CAG CTG TTT TCT 1243  
 Glu Pro Thr Val Leu Arg Pro Ala Asp Leu Glu Lys Gln Leu Phe Ser  
 250 255 260

20CTG CCA CAC TGG AGG ACA GAT GGG CAC AAC CAC GTC ATT ATC AAC CTG 1291  
 Leu Pro His Trp Arg Thr Asp Gly His Asn His Val Ile Ile Asn Leu  
 265 270 275

TCC CGG AAG TCA GAC ACA CAG AAT CTA CTG TAC AAC GTC AGT ACA GGC 1339  
 25Ser Arg Lys Ser Asp Thr Gln Asn Leu Leu Tyr Asn Val Ser Thr Gly  
 280 285 290

CGC CAT GTG GCC CAG TCC ACC CTC TAT GCT GCC CAG TAC AGA GCT GGC 1387  
 Arg His Val Ala Gln Ser Thr Leu Tyr Ala Ala Gln Tyr Arg Ala Gly  
 30295 300 305 310

TTT GAC CTG GTC GTG TCA CCC CTT GTC CAT GCT ATG TCT GAA CCC AAC 1435  
 Phe Asp Leu Val Val Ser Pro Leu Val His Ala Met Ser Glu Pro Asn  
 315 320 325

35  
 TTC ATG GAA ATC CCA CCG CAG GTG CCA GTT AAG CGG AAA TAT CTC TTC 1483  
 Phe Met Glu Ile Pro Pro Gln Val Pro Val Lys Arg Lys Tyr Leu Phe  
 330 335 340

40ACT TTC CAG GGC GAG AAG ATC GAG TCT CTG AGA TCT AGC CTT CAG GAG 1531  
 Thr Phe Gln Gly Glu Lys Ile Glu Ser Leu Arg Ser Ser Leu Gln Glu  
 345 350 355

GCC CGT TCC TTC GAG GAA GAG ATG GAG GGC GAC CCT CCG GCC GAC TAT 1579  
 45Ala Arg Ser Phe Glu Glu Glu Met Glu Gly Asp Pro Pro Ala Asp Tyr  
 360 365 370

GAC GAT CGC ATC ATT GCC ACC CTA AAG GCT GTA CAG GAC AGC AAG CTG 1627  
 Asp Asp Arg Ile Ile Ala Thr Leu Lys Ala Val Gln Asp Ser Lys Leu  
 50375 380 385 390

GAT CAG GTG CTG GTA GAA TTC ACT TGC AAA AAC CAG CCG AAG CCT AGC 1675  
 Asp Gln Val Leu Val Glu Phe Thr Cys Lys Asn Gln Pro Lys Pro Ser  
 395 400 405

55  
 CTG CCG ACT GAG TGG GCA CTG TGT GGG GAG CGG GAA GAC CGC CTG GAG 1723  
 Leu Pro Thr Glu Trp Ala Leu Cys Gly Glu Arg Glu Asp Arg Leu Glu  
 410 415 420

60TTA CTG AAG CTC TCC ACC TTC GCC CTC ATC ATC ACT CCC GGG GAC CCG 1771  
 Leu Leu Lys Leu Ser Thr Phe Ala Leu Ile Ile Thr Pro Gly Asp Pro  
 425 430 435

09809920 1031501

|    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
|    | CGC | CTG | CTC | ATT | TCA | TCT | GGG | TGT | GCC | ACG | CGG | CTC | TTC | GAG | GCC | CTG | 1819 |
|    | Arg | Leu | Leu | Ile | Ser | Ser | Gly | Cys | Ala | Thr | Arg | Leu | Phe | Glu | Ala | Leu |      |
|    | 440 |     |     |     |     |     | 445 |     |     |     |     | 450 |     |     |     |     |      |
| 5  | GAG | GTG | GGG | GCC | GTG | CCG | GTG | GTG | CTC | GGG | GAG | CAG | GTG | CAG | CTC | CCG | 1867 |
|    | Glu | Val | Gly | Ala | Val | Pro | Val | Val | Leu | Gly | Glu | Gln | Val | Gln | Leu | Pro |      |
|    | 455 |     |     |     |     | 460 |     |     |     |     | 465 |     |     |     |     | 470 |      |
|    | TAC | CAC | GAC | ATG | CTG | CAG | TGG | AAC | GAG | GCC | GCC | CTG | GTG | GTG | CCC | AAG | 1915 |
| 10 | Tyr | His | Asp | Met | Leu | Gln | Trp | Asn | Glu | Ala | Ala | Leu | Val | Val | Pro | Lys |      |
|    |     |     |     |     | 475 |     |     |     |     | 480 |     |     |     |     | 485 |     |      |
|    | CCT | CGC | GTC | ACA | GAG | GTC | CAC | TTC | CTG | TTA | CGA | AGT | CTT | TCA | GAC | AGT | 1963 |
| 15 | Pro | Arg | Val | Thr | Glu | Val | His | Phe | Leu | Leu | Arg | Ser | Leu | Ser | Asp | Ser |      |
|    |     |     |     |     | 490 |     |     |     | 495 |     |     |     |     | 500 |     |     |      |
|    | GAT | CTG | TTG | GCC | ATG | AGG | CGG | CAA | GGC | CGC | TTT | CTC | TGG | GAG | ACC | TAC | 2011 |
|    | Asp | Leu | Leu | Ala | Met | Arg | Arg | Gln | Gly | Arg | Phe | Leu | Trp | Glu | Thr | Tyr |      |
|    |     |     |     | 505 |     |     |     | 510 |     |     |     |     | 515 |     |     |     |      |
| 20 | TTC | TCC | ACC | GCA | GAC | AGT | ATT | TTT | AAT | ACC | GTG | CTG | GCC | ATG | ATT | AGG | 2059 |
|    | Phe | Ser | Thr | Ala | Asp | Ser | Ile | Phe | Asn | Thr | Val | Leu | Ala | Met | Ile | Arg |      |
|    |     |     |     | 520 |     |     | 525 |     |     |     |     | 530 |     |     |     |     |      |
| 25 | ACT | CGA | ATT | CAG | ATC | CCA | GCT | GCT | CCC | ATC | CGG | GAA | GAG | GTA | GCG | GCT | 2107 |
|    | Thr | Arg | Ile | Gln | Ile | Pro | Ala | Ala | Pro | Ile | Arg | Glu | Glu | Val | Ala | Ala |      |
|    |     |     |     |     |     | 540 |     |     |     |     | 545 |     |     |     |     | 550 |      |
|    | GAG | ATC | CCC | CAT | CGT | TCA | GGC | AAA | GCA | GCT | GGA | ACT | GAC | CCC | AAC | ATG | 2155 |
| 30 | Glu | Ile | Pro | His | Arg | Ser | Gly | Lys | Ala | Ala | Gly | Thr | Asp | Pro | Asn | Met |      |
|    |     |     |     |     | 555 |     |     |     |     | 560 |     |     |     |     |     | 565 |      |
|    | GCT | GAC | AAT | GGG | GAC | CTG | GAC | CTG | GGG | CCG | GTA | GAG | ACA | GAA | CCA | CCC | 2203 |
| 35 | Ala | Asp | Asn | Gly | Asp | Leu | Asp | Leu | Gly | Pro | Val | Glu | Thr | Glu | Pro | Pro |      |
|    |     |     |     | 570 |     |     |     |     | 575 |     |     |     |     | 580 |     |     |      |
|    | TAT | GCC | TCA | CCT | AAA | TAC | CTC | CGC | AAT | TTC | ACT | CTG | ACT | GTC | ACA | GAC | 2251 |
|    | Tyr | Ala | Ser | Pro | Lys | Tyr | Leu | Arg | Asn | Phe | Thr | Leu | Thr | Val | Thr | Asp |      |
|    |     |     |     | 585 |     |     |     | 590 |     |     |     |     | 595 |     |     |     |      |
| 40 | TGT | TAC | CGT | GGC | TGG | AAC | TCT | GCC | CCG | GGA | CGG | TTC | CAT | CTT | TTT | CCC | 2299 |
|    | Cys | Tyr | Arg | Gly | Trp | Asn | Ser | Ala | Pro | Gly | Arg | Phe | His | Leu | Phe | Pro |      |
|    |     |     |     |     |     |     | 605 |     |     |     |     | 610 |     |     |     |     |      |
| 45 | CAC | ACA | CCC | TTT | GAT | CCT | GTG | TTG | CCC | TCT | GAG | GCC | AAA | TTC | TTG | GGC | 2347 |
|    | His | Thr | Pro | Phe | Asp | Pro | Val | Leu | Pro | Ser | Glu | Ala | Lys | Phe | Leu | Gly |      |
|    |     |     |     |     |     | 620 |     |     |     |     | 625 |     |     |     |     | 630 |      |
|    | TCA | GGG | ACT | GGA | TTT | CGG | CCG | ATC | GGT | GGC | GGG | GCT | GGG | GGC | TCT | GGC | 2395 |
| 50 | Ser | Gly | Thr | Gly | Phe | Arg | Pro | Ile | Gly | Gly | Gly | Ala | Gly | Gly | Ser | Gly |      |
|    |     |     |     |     | 635 |     |     |     |     | 640 |     |     |     |     | 645 |     |      |
|    | AAG | GAG | TTC | CAG | GCA | GCG | CTC | GGA | GGC | AAT | GTC | CAG | CGG | GAG | CAG | TTC | 2443 |
| 55 | Lys | Glu | Phe | Gln | Ala | Ala | Leu | Gly | Gly | Asn | Val | Gln | Arg | Glu | Gln | Phe |      |
|    |     |     |     | 650 |     |     |     |     | 655 |     |     |     |     | 660 |     |     |      |
|    | ACA | GTT | GTG | ATG | CTG | ACC | TAC | GAG | CGG | GAG | GAA | GTG | CTC | ATG | AAC | TCC | 2491 |
|    | Thr | Val | Val | Met | Leu | Thr | Tyr | Glu | Arg | Glu | Glu | Val | Leu | Met | Asn | Ser |      |
|    |     |     |     | 665 |     |     |     | 670 |     |     |     |     | 675 |     |     |     |      |
| 60 | CTG | GAG | AGA | CTC | AAC | GGC | CTC | CCC | TAC | CTG | AAC | AAG | GTA | GTG | GTG | GTG | 2539 |
|    | Leu | Glu | Arg | Leu | Asn | Gly | Leu | Pro | Tyr | Leu | Asn | Lys | Val | Val | Val | Val |      |
|    |     |     |     | 680 |     |     | 685 |     |     |     |     | 690 |     |     |     |     |      |

0980990-031601

[illegible]

ACTGAGGACT GTTCATAAGC CCAGGACA

3479

## (2) INFORMATION FOR SEQ ID NO:2:

5

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 918 amino acids

(B) TYPE: amino acid

(D) TOPOLOGY: linear

10

## (ii) MOLECULE TYPE: protein

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:2:

15Met Thr Gly Tyr Thr Met Leu Arg Asn Gly Gly Val Gly Asn Gly Gly  
     1                    5                    10                    15  
     Gln Thr Cys Met Leu Arg Trp Ser Asn Arg Ile Arg Leu Thr Trp Leu  
                     20                    25                    30  
 20Ser Phe Thr Leu Phe Ile Ile Leu Val Phe Phe Pro Leu Ile Ala His  
                     35                    40                    45  
     Tyr Tyr Leu Thr Thr Leu Asp Glu Ala Asp Glu Ala Gly Lys Arg Ile  
 25                    50                    55                    60  
     Phe Gly Pro Arg Ala Gly Ser Glu Leu Cys Glu Val Lys His Val Leu  
                     65                    70                    75                    80  
 30Asp Leu Cys Arg Ile Arg Glu Ser Val Ser Glu Glu Leu Leu Gln Leu  
                     85                    90                    95  
     Glu Ala Lys Arg Gln Glu Leu Asn Ser Glu Ile Ala Lys Leu Asn Leu  
                     100                    105                    110  
 35Lys Ile Glu Ala Cys Lys Lys Ser Ile Glu Asn Ala Lys Gln Asp Leu  
                     115                    120                    125  
     Leu Gln Leu Lys Asn Val Ile Ser Gln Thr Glu His Ser Tyr Lys Glu  
 40                    130                    135                    140  
     Leu Met Ala Gln Asn Gln Pro Lys Leu Ser Leu Pro Ile Arg Leu Leu  
                     145                    150                    155                    160  
 45Pro Glu Lys Asp Asp Ala Gly Leu Pro Pro Pro Lys Val Thr Arg Gly  
                     165                    170                    175  
     Cys Arg Leu His Asn Cys Phe Asp Tyr Ser Arg Cys Pro Leu Thr Ser  
                     180                    185                    190  
 50Gly Phe Pro Val Tyr Val Tyr Asp Ser Asp Gln Phe Ala Phe Gly Ser  
                     195                    200                    205  
     Tyr Leu Asp Pro Leu Val Lys Gln Ala Phe Gln Ala Thr Val Arg Ala  
 55                    210                    215                    220  
     Asn Val Tyr Val Thr Glu Asn Ala Ala Ile Ala Cys Leu Tyr Val Val  
                     225                    230                    235                    240  
 60Leu Val Gly Glu Met Gln Glu Pro Thr Val Leu Arg Pro Ala Asp Leu  
                     245                    250                    255  
     Glu Lys Gln Leu Phe Ser Leu Pro His Trp Arg Thr Asp Gly His Asn

"03609202" REVERSED

|    | 260 |     |     |     |     |     |     |     | 265 |     |     |     | 270 |     |     |     |  |  |  |  |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|--|--|
|    | His | Val | Ile | Ile | Asn | Leu | Ser | Arg | Lys | Ser | Asp | Thr | Gln | Asn | Leu | Leu |  |  |  |  |
|    |     |     | 275 |     |     |     |     | 280 |     |     |     |     | 285 |     |     |     |  |  |  |  |
| 5  | Tyr | Asn | Val | Ser | Thr | Gly | Arg | His | Val | Ala | Gln | Ser | Thr | Leu | Tyr | Ala |  |  |  |  |
|    |     | 290 |     |     |     |     | 295 |     |     |     |     | 300 |     |     |     |     |  |  |  |  |
|    | Ala | Gln | Tyr | Arg | Ala | Gly | Phe | Asp | Leu | Val | Val | Ser | Pro | Leu | Val | His |  |  |  |  |
| 10 | 305 |     |     |     |     | 310 |     |     |     |     | 315 |     |     |     |     | 320 |  |  |  |  |
|    | Ala | Met | Ser | Glu | Pro | Asn | Phe | Met | Glu | Ile | Pro | Pro | Gln | Val | Pro | Val |  |  |  |  |
|    |     |     |     |     | 325 |     |     |     |     | 330 |     |     |     |     | 335 |     |  |  |  |  |
| 15 | Lys | Arg | Lys | Tyr | Leu | Phe | Thr | Phe | Gln | Gly | Glu | Lys | Ile | Glu | Ser | Leu |  |  |  |  |
|    |     |     |     | 340 |     |     |     |     | 345 |     |     |     |     | 350 |     |     |  |  |  |  |
|    | Arg | Ser | Ser | Leu | Gln | Glu | Ala | Arg | Ser | Phe | Glu | Glu | Glu | Met | Glu | Gly |  |  |  |  |
| 20 |     |     | 355 |     |     |     |     | 360 |     |     |     |     | 365 |     |     |     |  |  |  |  |
|    | Asp | Pro | Pro | Ala | Asp | Tyr | Asp | Asp | Arg | Ile | Ile | Ala | Thr | Leu | Lys | Ala |  |  |  |  |
|    |     | 370 |     |     |     |     | 375 |     |     |     |     | 380 |     |     |     |     |  |  |  |  |
|    | Val | Gln | Asp | Ser | Lys | Leu | Asp | Gln | Val | Leu | Val | Glu | Phe | Thr | Cys | Lys |  |  |  |  |
| 25 | 385 |     |     |     |     | 390 |     |     |     |     | 395 |     |     |     |     | 400 |  |  |  |  |
|    | Asn | Gln | Pro | Lys | Pro | Ser | Leu | Pro | Thr | Glu | Trp | Ala | Leu | Cys | Gly | Glu |  |  |  |  |
|    |     |     |     |     | 405 |     |     |     |     | 410 |     |     |     |     | 415 |     |  |  |  |  |
| 30 | Arg | Glu | Asp | Arg | Leu | Glu | Leu | Leu | Lys | Leu | Ser | Thr | Phe | Ala | Leu | Ile |  |  |  |  |
|    |     |     |     | 420 |     |     |     |     | 425 |     |     |     |     | 430 |     |     |  |  |  |  |
|    | Ile | Thr | Pro | Gly | Asp | Pro | Arg | Leu | Leu | Ile | Ser | Ser | Gly | Cys | Ala | Thr |  |  |  |  |
|    |     |     | 435 |     |     |     |     | 440 |     |     |     |     | 445 |     |     |     |  |  |  |  |
| 35 | Arg | Leu | Phe | Glu | Ala | Leu | Glu | Val | Gly | Ala | Val | Pro | Val | Val | Leu | Gly |  |  |  |  |
|    |     | 450 |     |     |     |     | 455 |     |     |     |     | 460 |     |     |     |     |  |  |  |  |
|    | Glu | Gln | Val | Gln | Leu | Pro | Tyr | His | Asp | Met | Leu | Gln | Trp | Asn | Glu | Ala |  |  |  |  |
| 40 | 465 |     |     |     |     | 470 |     |     |     |     | 475 |     |     |     |     | 480 |  |  |  |  |
|    | Ala | Leu | Val | Val | Pro | Lys | Pro | Arg | Val | Thr | Glu | Val | His | Phe | Leu | Leu |  |  |  |  |
|    |     |     |     |     | 485 |     |     |     |     | 490 |     |     |     |     | 495 |     |  |  |  |  |
| 45 | Arg | Ser | Leu | Ser | Asp | Ser | Asp | Leu | Leu | Ala | Met | Arg | Arg | Gln | Gly | Arg |  |  |  |  |
|    |     |     |     | 500 |     |     |     |     | 505 |     |     |     |     | 510 |     |     |  |  |  |  |
|    | Phe | Leu | Trp | Glu | Thr | Tyr | Phe | Ser | Thr | Ala | Asp | Ser | Ile | Phe | Asn | Thr |  |  |  |  |
|    |     |     | 515 |     |     |     |     | 520 |     |     |     |     | 525 |     |     |     |  |  |  |  |
| 50 | Val | Leu | Ala | Met | Ile | Arg | Thr | Arg | Ile | Gln | Ile | Pro | Ala | Ala | Pro | Ile |  |  |  |  |
|    |     | 530 |     |     |     |     | 535 |     |     |     |     | 540 |     |     |     |     |  |  |  |  |
|    | Arg | Glu | Glu | Val | Ala | Ala | Glu | Ile | Pro | His | Arg | Ser | Gly | Lys | Ala | Ala |  |  |  |  |
| 55 | 545 |     |     |     |     | 550 |     |     |     |     | 555 |     |     |     |     | 560 |  |  |  |  |
|    | Gly | Thr | Asp | Pro | Asn | Met | Ala | Asp | Asn | Gly | Asp | Leu | Asp | Leu | Gly | Pro |  |  |  |  |
|    |     |     |     |     | 565 |     |     |     |     | 570 |     |     |     |     | 575 |     |  |  |  |  |
| 60 | Val | Glu | Thr | Glu | Pro | Pro | Tyr | Ala | Ser | Pro | Lys | Tyr | Leu | Arg |     |     |  |  |  |  |

|    | 595 |     |     |     |     | 600 |     |     |     |     | 605 |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|    | Arg | Phe | His | Leu | Phe | Pro | His | Thr | Pro | Phe | Asp | Pro | Val | Leu | Pro | Ser |
|    | 610 |     |     |     |     |     | 615 |     |     |     |     | 620 |     |     |     |     |
| 5  | Glu | Ala | Lys | Phe | Leu | Gly | Ser | Gly | Thr | Gly | Phe | Arg | Pro | Ile | Gly | Gly |
|    | 625 |     |     |     |     | 630 |     |     |     |     | 635 |     |     |     |     | 640 |
| 10 | Gly | Ala | Gly | Gly | Ser | Gly | Lys | Glu | Phe | Gln | Ala | Ala | Leu | Gly | Gly | Asn |
|    |     |     |     |     | 645 |     |     |     |     | 650 |     |     |     | 655 |     |     |
|    | Val | Gln | Arg | Glu | Gln | Phe | Thr | Val | Val | Met | Leu | Thr | Tyr | Glu | Arg | Glu |
|    |     |     |     | 660 |     |     |     |     | 665 |     |     |     |     | 670 |     |     |
| 15 | Glu | Val | Leu | Met | Asn | Ser | Leu | Glu | Arg | Leu | Asn | Gly | Leu | Pro | Tyr | Leu |
|    |     |     | 675 |     |     |     |     | 680 |     |     |     |     | 685 |     |     |     |
|    | Asn | Lys | Val | Val | Val | Val | Trp | Asn | Ser | Pro | Lys | Leu | Pro | Ser | Glu | Asp |
|    | 690 |     |     |     |     |     | 695 |     |     |     |     | 700 |     |     |     |     |
| 20 | Leu | Leu | Trp | Pro | Asp | Ile | Gly | Val | Pro | Ile | Met | Val | Val | Arg | Thr | Glu |
|    | 705 |     |     |     |     | 710 |     |     |     |     | 715 |     |     |     |     | 720 |
|    | Lys | Asn | Ser | Leu | Asn | Asn | Arg | Phe | Leu | Pro | Trp | Asn | Glu | Ile | Glu | Thr |
| 25 |     |     |     |     | 725 |     |     |     |     | 730 |     |     |     |     | 735 |     |
|    | Glu | Ala | Ile | Leu | Ser | Ile | Asp | Asp | Asp | Ala | His | Leu | Arg | His | Asp | Glu |
|    |     |     |     | 740 |     |     |     | 745 |     |     |     |     |     | 750 |     |     |
| 30 | Ile | Met | Phe | Gly | Phe | Trp | Val | Trp | Arg | Glu | Ala | Arg | Asp | Arg | Ile | Val |
|    |     |     | 755 |     |     |     |     | 760 |     |     |     |     | 765 |     |     |     |
|    | Gly | Phe | Pro | Gly | Arg | Tyr | His | Ala | Trp | Asp | Ile | Pro | His | Gln | Ser | Trp |
|    | 770 |     |     |     |     | 775 |     |     |     |     | 780 |     |     |     |     |     |
| 35 | Leu | Tyr | Asn | Ser | Asn | Tyr | Ser | Cys | Glu | Leu | Ser | Met | Val | Leu | Thr | Gly |
|    | 785 |     |     |     |     | 790 |     |     |     |     | 795 |     |     |     |     | 800 |
|    | Ala | Ala | Phe | Phe | His | Lys | Tyr | Tyr | Ala | Tyr | Leu | Tyr | Ser | Tyr | Val | Met |
| 40 |     |     |     |     | 805 |     |     |     |     | 810 |     |     |     |     | 815 |     |
|    | Pro | Gln | Ala | Ile | Arg | Asp | Met | Val | Asp | Glu | Tyr | Ile | Asn | Cys | Glu | Asp |
|    |     |     |     | 820 |     |     |     |     | 825 |     |     |     |     | 830 |     |     |
| 45 | Ile | Ala | Met | Asn | Phe | Leu | Val | Ser | His | Ile | Thr | Arg | Lys | Pro | Pro | Ile |
|    |     |     | 835 |     |     |     |     | 840 |     |     |     |     | 845 |     |     |     |
|    | Lys | Val | Thr | Ser | Arg | Trp | Thr | Phe | Arg | Cys | Pro | Gly | Cys | Pro | Gln | Ala |
|    | 850 |     |     |     |     | 855 |     |     |     |     | 860 |     |     |     |     |     |
| 50 | Leu | Ser | His | Asp | Asp | Ser | His | Phe | His | Glu | Arg | His | Lys | Cys | Ile | Asn |
|    | 865 |     |     |     |     | 870 |     |     |     |     | 875 |     |     |     |     | 880 |
|    | Phe | Phe | Val | Lys | Val | Tyr | Gly | Tyr | Met | Pro | Leu | Leu | Tyr | Thr | Gln | Phe |
| 55 |     |     |     |     | 885 |     |     |     |     | 890 |     |     |     |     | 895 |     |
|    | Arg | Val | Asp | Ser | Val | Leu | Phe | Lys | Thr | Arg | Leu | Pro | His | Asp | Lys | Thr |
|    |     |     |     | 900 |     |     |     |     | 905 |     |     |     |     | 910 |     |     |
| 60 | Lys | Cys | Phe | Lys | Phe | Ile |     |     |     |     |     |     |     |     |     |     |
|    |     |     |     | 915 |     |     |     |     |     |     |     |     |     |     |     |     |

(2) INFORMATION FOR SEQ ID NO:3:



5

(11) MOLECULE TYPE: DNA (genomic)

```

10      (ix) FEATURE:
           (A) NAME/KEY: CDS
           (B) LOCATION: 594..3350

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15 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:3:

|    |            |            |            |            |             |            |     |
|----|------------|------------|------------|------------|-------------|------------|-----|
|    | GGCGGGTCCC | TGAGCTGGAA | GCCGGAGAGC | AAGCCCTGGA | GGTTCACCTCT | TTCAAGAAGT | 60  |
| 20 | CGTGTGCTGA | GGTGTAATGC | TACACAAGTC | AGAGGAAGGA | AGGGTCCTGA  | AACACATGGC | 120 |
|    | CTGATTGTTG | GCAAAGGCAT | CATAAGAAGC | TGGCATTAT  | TTCTGTTCTA  | ACCTATTACT | 180 |
|    | GTATAACTGT | GAATAGACAC | TATGCATATT | TGTTGGTCAG | CAAAACCAAG  | AAACAAGAGC | 240 |
| 25 | TATGGCATTT | GAAAAAGTCT | GTCTGATTCC | AGGGTGTTTT | TCCTGGGTTT  | CATCATCAGG | 300 |
|    | TACCTCCTCC | CTTTCATCTC | AGCAAGAATG | TGGCACCTTT | TATCGTTTGA  | TAAAGATTAA | 360 |
| 30 | GGACATGTTT | TTTGGTCAAC | AGCCAGAACT | TAAAATCTGC | TGGAATAGGG  | TCAGAGACCA | 420 |
|    | TTTCAGCTGC | AGCTGAGGAA | AATGAAATGT | TCATTTTATT | TGGTGCCTTG  | TCTGGGGAGC | 480 |
|    | ACACTAACTC | TTCTGGAAAC | GTGTCAGTGA | AACAGAGATC | GTTTTGTGGA  | ATAGCAACCC | 540 |
| 35 | ATGGTTATGG | CGAGTGACCC | GACGTGATCT | GGGGGGCAGG | CTGCAGAGGA  | CTC ATG    | 596 |
|    |            |            |            |            |             | Met        |     |

ACA GGC TAT ACC ATG CTG CGG AAT GGG GGC GCG GGG AAC GGA GGT CAG 644  
40Thr Gly Tyr Thr Met Leu Arg Asn Gly Gly Ala Gly Asn Gly Gly Gln  
920 925 930 935

ACC TGC ATG CTG CGC TGG TCC AAC CGC ATC CGC CTC ACG TGG CTC AGC 692  
Thr Cys Met Leu Arg Trp Ser Asn Arg Ile Arg Leu Thr Trp Leu Ser  
45 940 945 950

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| TTC | ACG | CTC | TTT | GTC | ATC | CTG | GTC | TTC | TTC | CCG | CTC | ATC | GCC | CAC | TAT | 740 |
| Phe | Thr | Leu | Phe | Val | Ile | Leu | Val | Phe | Phe | Pro | Leu | Ile | Ala | His | Tyr |     |
|     |     |     | 955 |     |     |     |     | 960 |     |     |     |     | 965 |     |     |     |

50

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| TAC | CTC | ACC | ACT | CTG | GAT | GAG | GCT | GAT | GAG | GCA | GGC | AAG | CGG | ATT | TTT | 788 |
| Tyr | Leu | Thr | Thr | Leu | Asp | Glu | Ala | Asp | Glu | Ala | Gly | Lys | Arg | Ile | Phe |     |
|     |     | 970 |     |     |     |     | 975 |     |     |     |     | 980 |     |     |     |     |

55GGT CCC CGG GTG GGG AAC GAG CTG TGC GAG GTG AAG CAC GTG CTG GAT 836  
 Gly Pro Arg Val Gly Asn Glu Leu Cys Glu Val Lys His Val Leu Asp  
 985 990 995

CTG TGC CGC ATC CGG GAG TCG GTG AGT GAA GAG CTC CTG CAG CTG GAG 884  
60Leu Cys Arg Ile Arg Glu Ser Val Ser Glu Glu Leu Leu Gln Leu Glu  
1000 1005 1010 1015

GCC AAG CGC CAA GAG CTG AAC AGC GAG ATC GCC AAG CTG AAT CTG AAG 932

|    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|    | Ala  | Lys  | Arg  | Gln  | Glu  | Leu  | Asn  | Ser  | Glu  | Ile  | Ala  | Lys  | Leu  | Asn  | Leu  | Lys  |      |
|    |      |      |      |      | 1020 |      |      |      |      | 1025 |      |      |      |      |      | 1030 |      |
|    | ATC  | GAA  | GCC  | TGT  | AAG  | AAG  | AGC  | ATT  | GAG  | AAC  | GCC  | AAG  | CAG  | GAC  | CTG  | CTC  | 980  |
| 5  | Ile  | Glu  | Ala  | Cys  | Lys  | Lys  | Ser  | Ile  | Glu  | Asn  | Ala  | Lys  | Gln  | Asp  | Leu  | Leu  |      |
|    |      |      |      | 1035 |      |      |      |      | 1040 |      |      |      |      | 1045 |      |      |      |
|    | CAG  | CTC  | AAG  | AAT  | GTC  | ATC  | AGC  | CAG  | ACC  | GAG  | CAT  | TCC  | TAC  | AAG  | GAG  | CTC  | 1028 |
| 10 | Gln  | Leu  | Lys  | Asn  | Val  | Ile  | Ser  | Gln  | Thr  | Glu  | His  | Ser  | Tyr  | Lys  | Glu  | Leu  |      |
|    |      |      | 1050 |      |      |      |      | 1055 |      |      |      |      | 1060 |      |      |      |      |
|    | ATG  | GCC  | CAG  | AAC  | CAG  | CCC  | AAG  | CTG  | TCC  | CTG  | CCC  | ATC  | CGA  | CTG  | CTC  | CCA  | 1076 |
| 15 | Met  | Ala  | Gln  | Asn  | Gln  | Pro  | Lys  | Leu  | Ser  | Leu  | Pro  | Ile  | Arg  | Leu  | Leu  | Pro  |      |
|    |      | 1065 |      |      |      |      | 1070 |      |      |      |      | 1075 |      |      |      |      |      |
|    | GAG  | AAG  | GAC  | GAT  | GCC  | GGC  | CTC  | CCT  | CCC  | CCG  | AAG  | GCC  | ACT  | CGG  | GGC  | TGC  | 1124 |
|    | Glu  | Lys  | Asp  | Asp  | Ala  | Gly  | Leu  | Pro  | Pro  | Pro  | Lys  | Ala  | Thr  | Arg  | Gly  | Cys  |      |
|    | 1080 |      |      |      |      | 1085 |      |      |      |      | 1090 |      |      |      |      | 1095 |      |
| 20 | CGG  | CTA  | CAC  | AAC  | TGC  | TTT  | GAT  | TAT  | TCT  | CGT  | TGC  | CCT  | CTC  | ACC  | TCT  | GGC  | 1172 |
|    | Arg  | Leu  | His  | Asn  | Cys  | Phe  | Asp  | Tyr  | Ser  | Arg  | Cys  | Pro  | Leu  | Thr  | Ser  | Gly  |      |
|    |      |      |      | 1100 |      |      |      |      |      | 1105 |      |      |      |      | 1110 |      |      |
|    | TTC  | CCG  | GTC  | TAC  | GTC  | TAT  | GAC  | AGT  | GAC  | CAG  | TTT  | GTC  | TTT  | GGC  | AGC  | TAC  | 1220 |
| 25 | Phe  | Pro  | Val  | Tyr  | Val  | Tyr  | Asp  | Ser  | Asp  | Gln  | Phe  | Val  | Phe  | Gly  | Ser  | Tyr  |      |
|    |      |      |      | 1115 |      |      |      |      | 1120 |      |      |      |      | 1125 |      |      |      |
|    | CTG  | GAT  | CCC  | TTG  | GTC  | AAG  | CAG  | GCT  | TTT  | CAG  | GCG  | ACA  | GCA  | CGA  | GCT  | AAC  | 1268 |
| 30 | Leu  | Asp  | Pro  | Leu  | Val  | Lys  | Gln  | Ala  | Phe  | Gln  | Ala  | Thr  | Ala  | Arg  | Ala  | Asn  |      |
|    |      |      | 1130 |      |      |      |      | 1135 |      |      |      |      | 1140 |      |      |      |      |
|    | GTT  | TAT  | GTT  | ACA  | GAA  | AAT  | GCA  | GAC  | ATC  | GCC  | TGC  | CTT  | TAC  | GTG  | ATA  | CTA  | 1316 |
|    | Val  | Tyr  | Val  | Thr  | Glu  | Asn  | Ala  | Asp  | Ile  | Ala  | Cys  | Leu  | Tyr  | Val  | Ile  | Leu  |      |
|    | 1145 |      |      |      |      |      | 1150 |      |      |      |      | 1155 |      |      |      |      |      |
| 35 | GTG  | GGA  | GAG  | ATG  | CAG  | GAG  | CCC  | GTG  | GTG  | CTG  | CGG  | CCT  | GCT  | GAG  | CTG  | GAG  | 1364 |
|    | Val  | Gly  | Glu  | Met  | Gln  | Glu  | Pro  | Val  | Val  | Leu  | Arg  | Pro  | Ala  | Glu  | Leu  | Glu  |      |
|    | 1160 |      |      |      |      | 1165 |      |      |      |      | 1170 |      |      |      |      | 1175 |      |
| 40 | AAG  | CAG  | TTG  | TAT  | TCC  | CTG  | CCA  | CAC  | TGG  | CGG  | ACG  | GAT  | GGA  | CAC  | AAC  | CAT  | 1412 |
|    | Lys  | Gln  | Leu  | Tyr  | Ser  | Leu  | Pro  | His  | Trp  | Arg  | Thr  | Asp  | Gly  | His  | Asn  | His  |      |
|    |      |      |      | 1180 |      |      |      |      |      | 1185 |      |      |      |      | 1190 |      |      |
|    | GTC  | ATC  | ATC  | AAT  | CTG  | TCA  | CGT  | AAG  | TCA  | GAT  | ACA  | CAG  | AAC  | CTT  | CTC  | TAT  | 1460 |
| 45 | Val  | Ile  | Ile  | Asn  | Leu  | Ser  | Arg  | Lys  | Ser  | Asp  | Thr  | Gln  | Asn  | Leu  | Leu  | Tyr  |      |
|    |      |      |      | 1195 |      |      |      |      | 1200 |      |      |      |      | 1205 |      |      |      |
|    | AAC  | GTC  | AGT  | ACT  | GGC  | CGT  | GCC  | ATG  | GTG  | GCC  | CAG  | TCC  | ACC  | TTC  | TAC  | ACT  | 1508 |
| 50 | Asn  | Val  | Ser  | Thr  | Gly  | Arg  | Ala  | Met  | Val  | Ala  | Gln  | Ser  | Thr  | Phe  | Tyr  | Thr  |      |
|    |      |      | 1210 |      |      |      |      | 1215 |      |      |      |      | 1220 |      |      |      |      |
|    | GTC  | CAG  | TAC  | AGA  | CCT  | GGC  | TTT  | GAC  | TTG  | GTC  | GTA  | TCA  | CCG  | CTG  | GTC  | CAT  | 1556 |
|    | Val  | Gln  | Tyr  | Arg  | Pro  | Gly  | Phe  | Asp  | Leu  | Val  | Val  | Ser  | Pro  | Leu  | Val  | His  |      |
|    | 1225 |      |      |      |      |      | 1230 |      |      |      |      | 1235 |      |      |      |      |      |
| 55 | GCC  | ATG  | TCT  | GAG  | CCC  | AAC  | TTC  | ATG  | GAA  | ATC  | CCA  | CCA  | CAG  | GTG  | CCG  | GTG  | 1604 |
|    | Ala  | Met  | Ser  | Glu  | Pro  | Asn  | Phe  | Met  | Glu  | Ile  | Pro  | Pro  | Gln  | Val  | Pro  | Val  |      |
|    | 1240 |      |      |      |      | 1245 |      |      |      |      | 1250 |      |      |      |      | 1255 |      |
| 60 | AAG  | CGG  | AAA  | TAT  | CTC  | TTC  | ACC  | TTC  | CAG  | GGC  | GAG  | AAG  | ATT  | GAG  | TCT  | CTG  | 1652 |
|    | Lys  | Arg  | Lys  | Tyr  | Leu  | Phe  | Thr  | Phe  | Gln  | Gly  | Glu  | Lys  | Ile  | Glu  | Ser  | Leu  |      |
|    |      |      |      | 1260 |      |      |      |      |      | 1265 |      |      |      |      | 1270 |      |      |

|    |      |     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----|------|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|    | AGG  | TCT | AGC | CTT  | CAG  | GAG  | GCC  | CGC  | TCC  | TTC  | GAA  | GAG  | GAA  | ATG  | GAG  | GGC  | 1700 |
|    | Arg  | Ser | Ser | Leu  | Gln  | Glu  | Ala  | Arg  | Ser  | Phe  | Glu  | Glu  | Glu  | Met  | Glu  | Gly  |      |
|    |      |     |     | 1275 |      |      |      |      | 1280 |      |      |      |      | 1285 |      |      |      |
| 5  | GAC  | CCT | CCC | GCC  | GAC  | TAC  | GAT  | GAC  | CGG  | ATC  | ATT  | GCC  | ACC  | CTG  | AAG  | GCG  | 1748 |
|    | Asp  | Pro | Pro | Ala  | Asp  | Tyr  | Asp  | Asp  | Arg  | Ile  | Ile  | Ala  | Thr  | Leu  | Lys  | Ala  |      |
|    |      |     |     | 1290 |      |      |      |      | 1295 |      |      |      |      | 1300 |      |      |      |
|    | GTG  | CAG | GAC | AGC  | AAG  | CTG  | GAT  | CAG  | GTC  | CTG  | GTG  | GAA  | TTC  | ACC  | TGC  | AAA  | 1796 |
| 10 | Val  | Gln | Asp | Ser  | Lys  | Leu  | Asp  | Gln  | Val  | Leu  | Val  | Glu  | Phe  | Thr  | Cys  | Lys  |      |
|    |      |     |     |      |      |      |      | 1310 |      |      |      |      | 1315 |      |      |      |      |
|    | AAC  | CAG | CCC | AAA  | CCC  | AGC  | CTG  | CCG  | ACT  | GAG  | TGG  | GCA  | CTG  | TGT  | GGA  | GAG  | 1844 |
|    | Asn  | Gln | Pro | Lys  | Pro  | Ser  | Leu  | Pro  | Thr  | Glu  | Trp  | Ala  | Leu  | Cys  | Gly  | Glu  |      |
| 15 | 1320 |     |     |      |      |      | 1325 |      |      |      |      | 1330 |      |      |      | 1335 |      |
|    | CGG  | GAG | GAC | CGC  | TTG  | GAA  | TTG  | CTG  | AAG  | CTC  | TCC  | ACC  | TTC  | GCC  | CTC  | ATC  | 1892 |
|    | Arg  | Glu | Asp | Arg  | Leu  | Glu  | Leu  | Leu  | Lys  | Leu  | Ser  | Thr  | Phe  | Ala  | Leu  | Ile  |      |
|    |      |     |     |      | 1340 |      |      |      |      |      | 1345 |      |      |      |      | 1350 |      |
| 20 |      |     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|    | ATT  | ACC | CCC | GGG  | GAC  | CCT  | CGC  | TTG  | GTT  | ATT  | TCC  | TCT  | GGG  | TGT  | GCA  | ACA  | 1940 |
|    | Ile  | Thr | Pro | Gly  | Asp  | Pro  | Arg  | Leu  | Val  | Ile  | Ser  | Ser  | Gly  | Cys  | Ala  | Thr  |      |
|    |      |     |     |      | 1355 |      |      |      |      | 1360 |      |      |      |      | 1365 |      |      |
| 25 | CGG  | CTC | TTC | GAA  | GCC  | CTG  | GAA  | GTC  | GGT  | GCC  | GTC  | CCG  | GTG  | GTG  | CTG  | GGG  | 1988 |
|    | Arg  | Leu | Phe | Glu  | Ala  | Leu  | Glu  | Val  | Gly  | Ala  | Val  | Pro  | Val  | Val  | Leu  | Gly  |      |
|    |      |     |     |      | 1370 |      |      |      | 1375 |      |      |      |      | 1380 |      |      |      |
|    | GAG  | CAG | GTC | CAG  | CTT  | CCC  | TAC  | CAG  | GAC  | ATG  | CTG  | CAG  | TGG  | AAC  | GAG  | GCG  | 2036 |
| 30 | Glu  | Gln | Val | Gln  | Leu  | Pro  | Tyr  | Gln  | Asp  | Met  | Leu  | Gln  | Trp  | Asn  | Glu  | Ala  |      |
|    |      |     |     |      |      |      |      | 1390 |      |      |      |      | 1395 |      |      |      |      |
|    | GCC  | CTG | GTG | GTG  | CCA  | AAG  | CCT  | CGT  | GTT  | ACC  | GAG  | GTT  | CAT  | TTC  | CTG  | CTC  | 2084 |
|    | Ala  | Leu | Val | Val  | Pro  | Lys  | Pro  | Arg  | Val  | Thr  | Glu  | Val  | His  | Phe  | Leu  | Leu  |      |
| 35 | 1400 |     |     |      |      |      | 1405 |      |      |      |      | 1410 |      |      |      | 1415 |      |
|    | AGA  | AGC | CTC | TCC  | GAT  | AGT  | GAC  | CTC  | CTG  | GCT  | ATG  | AGG  | CGG  | CAA  | GGC  | CGC  | 2132 |
|    | Arg  | Ser | Leu | Ser  | Asp  | Ser  | Asp  | Leu  | Leu  | Ala  | Met  | Arg  | Arg  | Gln  | Gly  | Arg  |      |
|    |      |     |     |      |      | 1420 |      |      |      |      | 1425 |      |      |      |      | 1430 |      |
| 40 |      |     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|    | TTT  | CTC | TGG | GAG  | ACT  | TAC  | TTC  | TCC  | ACT  | GCT  | GAC  | AGT  | ATT  | TTT  | AAT  | ACC  | 2180 |
|    | Phe  | Leu | Trp | Glu  | Thr  | Tyr  | Phe  | Ser  | Thr  | Ala  | Asp  | Ser  | Ile  | Phe  | Asn  | Thr  |      |
|    |      |     |     |      | 1435 |      |      |      |      | 1440 |      |      |      |      | 1445 |      |      |
| 45 | GTG  | CTG | GCT | ATG  | ATT  | AGG  | ACT  | CGC  | ATC  | CAG  | ATC  | CCA  | GCC  | GCT  | CCC  | ATC  | 2228 |
|    | Val  | Leu | Ala | Met  | Ile  | Arg  | Thr  | Arg  | Ile  | Gln  | Ile  | Pro  | Ala  | Ala  | Pro  | Ile  |      |
|    |      |     |     |      | 1450 |      |      |      | 1455 |      |      |      |      |      |      |      |      |

|    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|    | CCT | TTC  | CAT  | CTT  | TTC  | CCC  | CAC  | ACT  | CCC  | TTT  | GAC  | CCT  | GTG  | TTG  | CCC  | TCA  | 2468 |
|    | Pro | Phe  | His  | Leu  | Phe  | Pro  | His  | Thr  | Pro  | Phe  | Asp  | Pro  | Val  | Leu  | Pro  | Ser  |      |
|    |     |      | 1530 |      |      |      |      | 1535 |      |      |      |      | 1540 |      |      |      |      |
| 5  | GAG | GCC  | AAA  | TTC  | TTG  | GGC  | TCA  | GGG  | ACT  | GGC  | TTT  | CGG  | CCT  | ATT  | GGT  | GGT  | 2516 |
|    | Glu | Ala  | Lys  | Phe  | Leu  | Gly  | Ser  | Gly  | Thr  | Gly  | Phe  | Arg  | Pro  | Ile  | Gly  | Gly  |      |
|    |     | 1545 |      |      |      |      | 1550 |      |      |      |      | 1555 |      |      |      |      |      |
| 10 | GGA | GCT  | GGG  | GGT  | TCT  | GGC  | AAG  | GAA  | TTT  | CAG  | GCA  | GCG  | CTT  | GGA  | GGC  | AAT  | 2564 |
|    | Gly | Ala  | Gly  | Gly  | Ser  | Gly  | Lys  | Glu  | Phe  | Gln  | Ala  | Ala  | Leu  | Gly  | Gly  | Asn  |      |
|    |     | 1560 |      |      |      |      | 1565 |      |      |      | 1570 |      |      |      |      | 1575 |      |
| 15 | GTT | CCC  | CGA  | GAG  | CAG  | TTC  | ACG  | GTG  | GTG  | ATG  | TTG  | ACT  | TAT  | GAG  | CGG  | GAG  | 2612 |
|    | Val | Pro  | Arg  | Glu  | Gln  | Phe  | Thr  | Val  | Val  | Met  | Leu  | Thr  | Tyr  | Glu  | Arg  | Glu  |      |
|    |     |      |      |      | 1580 |      |      |      |      | 1585 |      |      |      |      | 1590 |      |      |
| 20 | GAA | GTG  | CTT  | ATG  | AAC  | TCT  | TTA  | GAG  | AGG  | CTG  | AAT  | GGC  | CTC  | CCT  | TAC  | CTG  | 2660 |
|    | Glu | Val  | Leu  | Met  | Asn  | Ser  | Leu  | Glu  | Arg  | Leu  | Asn  | Gly  | Leu  | Pro  | Tyr  | Leu  |      |
|    |     |      |      |      | 1595 |      |      |      | 1600 |      |      |      |      | 1605 |      |      |      |
| 25 | AAC | AAG  | GTC  | GTG  | GTG  | GTG  | TGG  | AAT  | TCT  | CCC  | AAG  | CTG  | CCA  | TCA  | GAG  | GAC  | 2708 |
|    | Asn | Lys  | Val  | Val  | Val  | Val  | Trp  | Asn  | Ser  | Pro  | Lys  | Leu  | Pro  | Ser  | Glu  | Asp  |      |
|    |     | --   | 1610 |      |      |      |      | 1615 |      |      |      |      | 1620 |      |      |      |      |
| 30 | CTT | CTG  | TGG  | CCT  | GAC  | ATT  | GGC  | GTT  | CCC  | ATC  | ATG  | GTG  | GTC  | CGT  | ACT  | GAG  | 2756 |
|    | Leu | Leu  | Trp  | Pro  | Asp  | Ile  | Gly  | Val  | Pro  | Ile  | Met  | Val  | Val  | Arg  | Thr  | Glu  |      |
|    |     |      | 1625 |      |      |      | 1630 |      |      |      |      | 1635 |      |      |      |      |      |
| 35 | AAG | AAC  | AGT  | TTG  | AAC  | AAC  | CGA  | TTC  | TTA  | CCC  | TGG  | AAT  | GAA  | ATT  | GAG  | ACA  | 2804 |
|    | Lys | Asn  | Ser  | Leu  | Asn  | Asn  | Arg  | Phe  | Leu  | Pro  | Trp  | Asn  | Glu  | Ile  | Glu  | Thr  |      |
|    |     | 1640 |      |      |      | 1645 |      |      |      |      | 1650 |      |      |      |      | 1655 |      |
| 40 | GAG | GCC  | ATC  | CTG  | TCC  | ATT  | GAT  | GAC  | GAT  | GCT  | CAC  | CTC  | CGC  | CAT  | GAC  | GAA  | 2852 |
|    | Glu | Ala  | Ile  | Leu  | Ser  | Ile  | Asp  | Asp  | Asp  | Ala  | His  | Leu  | Arg  | His  | Asp  | Glu  |      |
|    |     |      |      |      | 1660 |      |      |      |      | 1665 |      |      |      |      | 1670 |      |      |
| 45 | ATC | ATG  | TTT  | GGG  | TTC  | CGG  | GTG  | TGG  | AGA  | GAA  | GCT  | CGG  | GAC  | CGC  | ATC  | GTG  | 2900 |
|    | Ile | Met  | Phe  | Gly  | Phe  | Arg  | Val  | Trp  | Arg  | Glu  | Ala  | Arg  | Asp  | Arg  | Ile  | Val  |      |
|    |     |      |      | 1675 |      |      |      | 1680 |      |      |      |      |      | 1685 |      |      |      |
| 50 | GGC | TTC  | CCT  | GGC  | CGT  | TAC  | CAC  | GCA  | TGG  | GAC  | ATC  | CCC  | CAT  | CAG  | TCC  | TGG  | 2948 |
|    | Gly | Phe  | Pro  | Gly  | Arg  | Tyr  | His  | Ala  | Trp  | Asp  | Ile  | Pro  | His  | Gln  | Ser  | Trp  |      |
|    |     |      | 1690 |      |      |      | 1695 |      |      |      |      |      | 1700 |      |      |      |      |
| 55 | CTC | TAC  | AAC  | TCC  | AAC  | TAC  | TCC  | TGT  | GAG  | CTG  | TCC  | ATG  | GTG  | CTG  | ACA  | GGT  | 2996 |
|    | Leu | Tyr  | Asn  | Ser  | Asn  | Tyr  | Ser  | Cys  | Glu  | Leu  | Ser  | Met  | Val  | Leu  | Thr  | Gly  |      |
|    |     | 1705 |      |      |      |      | 1710 |      |      |      |      | 1715 |      |      |      |      |      |
| 60 | GCT | GCC  | TTT  | TTT  | CAC  | AAG  | TAT  | TAT  | GCC  | TAC  | CTG  | TAT  | TCT  | TAT  | GTG  | ATG  | 3044 |
|    | Ala | Ala  | Phe  | Phe  | His  | Lys  | Tyr  | Tyr  | Ala  | Tyr  | Leu  | Tyr  | Ser  | Tyr  | Val  | Met  |      |
|    |     | 1720 |      |      |      | 1725 |      |      |      |      | 1730 |      |      |      |      | 1735 |      |
| 65 | CCC | CAG  | GCC  | ATC  | CGG  | GAC  | ATG  | GTG  | GAT  | GAA  | TAC  | ATC  | AAC  | TGT  | GAG  | GAC  | 3092 |
|    | Pro | Gln  | Ala  | Ile  | Arg  | Asp  | Met  | Val  | Asp  | Glu  | Tyr  | Ile  | Asn  | Cys  | Glu  | Asp  |      |
|    |     |      |      | 1740 |      |      |      |      |      | 1745 |      |      |      |      | 1750 |      |      |
| 70 | ATT | GCC  | ATG  | AAC  | TTC  | CTT  | GTC  | TCC  | CAC  | ATC  | ACT  | CGG  | AAG  | CCC  | CCC  | ATC  | 3140 |
|    | Ile | Ala  | Met  | Asn  | Phe  | Leu  | Val  | Ser  | His  | Ile  | Thr  | Arg  | Lys  | Pro  | Pro  | Ile  |      |
|    |     |      |      | 1755 |      |      |      |      | 1760 |      |      |      |      | 1765 |      |      |      |
| 75 | AAG | GTG  | ACC  | TCA  | CGG  | TGG  | ACA  | TTC  | CGA  | TGC  | CCA  | GGA  | TGC  | CCT  | CAG  | GCC  | 3188 |
|    | Lys | Val  | Thr  | Ser  | Arg  | Trp  | Thr  | Phe  | Arg  | Cys  | Pro  | Gly  | Cys  | Pro  | Gln  | Ala  |      |
|    |     | 1770 |      |      |      |      | 1775 |      |      |      |      |      | 1780 |      |      |      |      |

|    |  |      |
|----|--|------|
|    | CTG TCT CAT GAT GAC TCC CAC TTC CAC GAG CGG CAC AAG TGC ATC AAC    | 3236 |
|    | Leu Ser His Asp Asp Ser His Phe His Glu Arg His Lys Cys Ile Asn    |      |
|    | 1785 1790 1795   |      |
| 5  | TTC TTC GTG AAG GTG TAC GGC TAC ATG CCC CTC CTG TAC ACG CAG TTC    | 3284 |
|    | Phe Phe Val Lys Val Tyr Gly Tyr Met Pro Leu Leu Tyr Thr Gln Phe    |      |
|    | 1800 1805 1810 1815  |      |
| 10 | AGG GTG GAT TCT GTG CTC TTC AAG ACA CGC CTG CCC CAT GAC AAG ACC    | 3332 |
|    | Arg Val Asp Ser Val Leu Phe Lys Thr Arg Leu Pro His Asp Lys Thr    |      |
|    | 1820 1825 1830   |      |
| 15 | AAG TGC TTC AAG TTC ATC TAGGGGCAGC GCACGGTCTG GGGAAGAGGA           | 3380 |
|    | Lys Cys Phe Lys Phe Ile  |      |
|    | 1835   |      |
|    | TGAGCAGAGG GAGGAAGATG GCTCCCAAGG TTCCTAGGCA TTGCAGGACC TTGGGCACAT  | 3440 |
|    | CTGCTGGTGG GTGGCCCAGA GCCTCTGCTG GAAGGGGCAG CAGGAGGAGT GGAAGGAAAC  | 3500 |
| 20 | CGCTGCCTTT ATCTTGAAGT CAGCCACACT GGGCCTGGAG CCCTGGGCGG AGTCCCCGGG  | 3560 |
|    | GTTCCCCACA CAGGGCACTG ACTGATAGCT TACACTGAGG ACTGTGGCGA CTCTGCAGAG  | 3620 |
| 25 | TCACTCACAC CGTTCGTACG CCCAGGACAG CTGGTTCGTG GTTTTTACAT TCAATAACAA  | 3680 |
|    | CTATTATGAT TATTTAAAAA GAGAAAGTTT CAGATTGACC ATTCAAGGCT TATTTATATA  | 3740 |
|    | TATGTGTGTG TATATAAATA CATGCACACA CTTGCATACA TATATATTTT TGGCTGGGGG  | 3800 |
| 30 | AGTGTGAGTT TTGCCTTTCT AAGGGAGGGA CCGCGCAGGC TCCTTTGTTC TGTATTCTGG  | 3860 |
|    | CGGAGATGGG TCCTGGCCTT GTGTCACCTG CTTATCCTTA AAGATCATCT CCCATCCTCC  | 3920 |
| 35 | CCAGCGCCAT CTGTGTGCAG CAACCAGAAA GGGATGAAC TGGCCCTCTT GCGGGCCTGG   | 3980 |
|    | ACAAGGTCTC TTCCTTACCC TTTCTGTTGC CAGTCAGCAA CCTGTAACTC ACATTCTCTT  | 4040 |
|    | CCCAGTGAAT CCCTGGGAGC GCCTGACCCT GGTGGGCTGT TCAGCTTCCT GCTGCTGGGG  | 4100 |
| 40 | CCAGCGATTT TTGAGGATTT ATCTTTAGGC CAGGCTTGCC TCCGTACTTA TCCCTGCTCT  | 4160 |
|    | CCCATTCTC TCTTGTGTTGA GAGAGAATGA GGAAGCAAAG AGTGAGAAAG AATAGGGGCT  | 4220 |
| 45 | GAAGACGCCA CTCCCAGATG GCTCTTTCTA TCCTGCTCTT CTGTTGAAAC ACACGTGCTG  | 4280 |
|    | TGGGCCCTCAG GCGTTTCTGA AGTGCTCTTT CTTGGATTGG ACAGGAGATC AGCAGCGTGC | 4340 |
|    | ACATCTGCTG TGGTCTGAAG TGGTTTGCAG GTCAGCCTCC TCTCCCTAGT GTAGAGCAAG  | 4400 |
| 50 | CCAGTGTCTT TCGAGGAACC CACCCGGCTG GCCGGGAAGT TTTACAGCAA GGCGCCTGCC  | 4460 |
|    | TTGGGATAAT TCCTTGGTGA AATTCACCTT CCCCCGCCT CTGTCTGGAG CCCCATCCTG   | 4520 |
| 55 | TGTTATCTGT GGTTTTTTGA CCCCTAATGT CAGCTTGGCT GTAGGACTCC CCGAGGTTTG  | 4580 |
|    | GTATGTGCTA GAACAATGGG AGGCTGTGAT TTGCTGTGTA AGCTCACATC CAGCCTTGGA  | 4640 |
|    | ATCTAACGGG CATTACAAAC CCGAGTTACC ACTTTCCACT CCCTGCTTAG GATTCTGTTC  | 4700 |
| 60 | CCTGGGCTGA AACTGAAATA AGCTAATTTT TTGGGTCACG GTGGCAGTAG GGGAACCTAG  | 4760 |
|    | GAGGGTGTGA GTGGCATTG TCAGGGATTT AGCCCATGAC GTGTTTCTTG AACCCTACTT   | 4820 |

TCTGGAAGTG GAGTTGACTC TGGAAGTTTT CTAGCAACTG AACAAAAGCT CAGGTTTGTC 4880  
 CTGGTCATGC ACATGCCTTA AGCCAGTTCC GTCTTCCCTA GACCTTGGCA TCCTGTGCTT 4940  
 5CTATTTCTTG GAATACGTTT TCCTCTGACC TGCCTGTACC ACGTGGGTCC TCTTCAAGTA 5000  
 CTGTTTTTGAA GCTGGGCTCT TTTGTGTAGC TCCCACCCAC CTGTAGGGCT AGCTCGGCTT 5060  
 AAGGGAACTC TCCCCATTGG CAAACCGGAC CCGGCCGCCG CCAGGACTGT GTTTCCAAAG 5120  
 10 GTTCCCCGCC CCCAACCCCA GCATCAGCCT GTAGCTCCCC TGCTGAGGCA GTGTGGTTAT 5180  
 GTTCCCAGCA GTGGGGGTCA GACGCCCTTC CTCAGAACTT TCTAGTTGCC CTCTACCTGA 5240  
 15CTCCTGACTT GTATTCTTTT TAGCAGTAGC CTTCTTCCCT CGGGGAGCCA AAGAGTGTGG 5300  
 TGTGTGGCGC TATATTGTGG CTGCTATTTT ATCTGGTTTC TTTTAATGTG AGGAACTCAC 5360  
 ATRACTGACTT CAGTGGGACT CGGTGAGCCG GGGCCGTCTG TGTGGTGGGA CCCCTTTAG 5420  
 20 CGGGACTCAG TGAGCTGGGG CCGTCTGTGT GGTGGAGCCA GGGCCTCTCC CTTTAGTGGA 5480  
 GCCAGGTTGT CGGGCCCCGA ATGTCACTGG TGGATCTAAG AAGGGCTGAG TGGTCTGACA 5540  
 25CCAAAACATG CCGCAGGGAG GGCTGTGGTG CCGGTGCTTC CAACAAGGAC AGCCCTCCTT 5600  
 GACCCTGAAA GGAACACTGG CTTGAAGGAC TGCAGACAGG CTCTGAGGGG CACGCCCTCC 5660  
 TCAGCGAGAG GCAGCAAGGT GGCCACAGTG TCACTGGTCA GGTGCTTCTC ACCACGGGAA 5720  
 30 AGCCGCCGAC CTGTGACTCG CTTGAGATGG GAAAGCGGCG CCACAGACCC CGGGTCTCCT 5780  
 TGGCTGTCTG TGGGCCGCCC CTGGCCACCT TGTCTGGCT CGCAGGGTGC AGGAGCGCCT 5840  
 35CGTTCTCTGG GTGGCCGGCT TGCTGCTCCG GTTTGGGCTG TCTTACCATA ACACCGTCCC 5900  
 AGGGCTCTGC AGGCCACTGT GAGCGCTGGC TCCCTGGGCA GTGCTCCTCC GTGTGGACTG 5960  
 TGCCTCAGGC CAGGGCTCAC CAGCTGGGGT CCTGTCCGGA AGGATGGGAT CTTTCTGGGA 6020  
 40 GCTGCGCCGG ACAGAGTGGG GAGCTCCTAG TTTGTGGGGG GAAGCTTTGA TATCCATGCC 6080  
 ACGTCCATCC ACCCCACCCC TTTTCGTCAC GAGCACAATG GTCTTACATT GGATTTTTGT 6140  
 45AAAAAATAA AAATAAATGG AGACTTTAAC TC 6172

## (2) INFORMATION FOR SEQ ID NO:4:

50 (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 919 amino acids  
 (B) TYPE: amino acid  
 (D) TOPOLOGY: linear

55 (ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:4:

Met Thr Gly Tyr Thr Met Leu Arg Asn Gly Gly Ala Gly Asn Gly Gly  
 60 1 5 10 15  
 Gln Thr Cys Met Leu Arg Trp Ser Asn Arg Ile Arg Leu Thr Trp Leu  
 20 25 30



|    |              |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|----|--------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
|    | Gly<br>370   | Asp        | Pro        | Pro        | Ala        | Asp        | Tyr<br>375 | Asp        | Asp        | Arg        | Ile        | Ile<br>380 | Ala        | Thr        | Leu        | Lys        |
|    | Ala<br>5385  | Val        | Gln        | Asp        | Ser        | Lys<br>390 | Leu        | Asp        | Gln        | Val        | Leu<br>395 | Val        | Glu        | Phe        | Thr        | Cys<br>400 |
|    | Lys          | Asn        | Gln        | Pro        | Lys<br>405 | Pro        | Ser        | Leu        | Pro        | Thr<br>410 | Glu        | Trp        | Ala        | Leu        | Cys<br>415 | Gly        |
| 10 | Glu          | Arg        | Glu        | Asp<br>420 | Arg        | Leu        | Glu        | Leu        | Leu<br>425 | Lys        | Leu        | Ser        | Thr        | Phe<br>430 | Ala        | Leu        |
|    | Ile          | Ile        | Thr<br>435 | Pro        | Gly        | Asp        | Pro        | Arg<br>440 | Leu        | Val        | Ile        | Ser        | Ser<br>445 | Gly        | Cys        | Ala        |
| 15 | Thr          | Arg<br>450 | Leu        | Phe        | Glu        | Ala        | Leu<br>455 | Glu        | Val        | Gly        | Ala        | Val<br>460 | Pro        | Val        | Val        | Leu        |
|    | Gly<br>20465 | Glu        | Gln        | Val        | Gln        | Leu<br>470 | Pro        | Tyr        | Gln        | Asp        | Met<br>475 | Leu        | Gln        | Trp        | Asn        | Glu<br>480 |
|    | Ala          | Ala        | Leu        | Val        | Val<br>485 | Pro        | Lys        | Pro        | Arg        | Val<br>490 | Thr        | Glu        | Val        | His        | Phe<br>495 | Leu        |
| 25 | Leu          | Arg        | Ser        | Leu<br>500 | Ser        | Asp        | Ser        | Asp        | Leu<br>505 | Leu        | Ala        | Met        | Arg        | Arg<br>510 | Gln        | Gly        |
|    | Arg          | Phe        | Leu<br>515 | Trp        | Glu        | Thr        | Tyr        | Phe<br>520 | Ser        | Thr        | Ala        | Asp        | Ser<br>525 | Ile        | Phe        | Asn        |
| 30 | Thr          | Val<br>530 | Leu        | Ala        | Met        | Ile        | Arg<br>535 | Thr        | Arg        | Ile        | Gln        | Ile<br>540 | Pro        | Ala        | Ala        | Pro        |
|    | Ile<br>35545 | Arg        | Glu        | Glu        | Ala        | Ala<br>550 | Ala        | Glu        | Ile        | Pro        | His<br>555 | Arg        | Ser        | Gly        | Lys        | Ala<br>560 |
|    | Ala          | Gly        | Thr        | Asp        | Pro<br>565 | Asn        | Met        | Ala        | Asp        | Asn<br>570 | Gly        | Asp        | Leu        | Asp        | Leu<br>575 | Gly        |
| 40 | Pro          | Val        | Glu        | Thr<br>580 | Glu        | Pro        | Pro        | Tyr        | Ala<br>585 | Ser        | Pro        | Arg        | Tyr        | Leu<br>590 | Arg        | Asn        |
|    | Phe          | Thr        | Leu<br>595 | Thr        | Val        | Thr        | Asp        | Phe<br>600 | Tyr        | Arg        | Ser        | Trp        | Asn<br>605 | Cys        | Ala        | Pro        |
| 45 | Gly          | Pro<br>610 | Phe        | His        | Leu        | Phe        | Pro<br>615 | His        | Thr        | Pro        | Phe        | Asp<br>620 | Pro        | Val        | Leu        | Pro        |
|    | Ser<br>50625 | Glu        | Ala        | Lys        | Phe        | Leu<br>630 | Gly        | Ser        | Gly        | Thr        | Gly<br>635 | Phe        | Arg        | Pro        | Ile        | Gly<br>640 |
|    | Gly          | Gly        | Ala        | Gly        | Gly<br>645 | Ser        | Gly        | Lys        | Glu        | Phe<br>650 | Gln        | Ala        | Ala        | Leu        | Gly<br>655 | Gly        |
| 55 | Asn          | Val        | Pro        | Arg<br>660 | Glu        | Gln        | Phe        | Thr        | Val<br>665 | Val        | Met        | Leu        | Thr        | Tyr<br>670 | Glu        | Arg        |
|    | Glu          | Glu        | Val<br>675 | Leu        | Met        | Asn        | Ser        | Leu<br>680 | Glu        | Arg        | Leu        | Asn        | Gly<br>685 | Leu        | Pro        | Tyr        |
| 60 | Leu          | Asn        | Lys        | Val        | Val        | Val        | Val<br>695 | Trp        | Asn        | Ser        | Pro        | Lys<br>700 | Leu        | Pro        | Ser        | Glu        |



60 Phe Ala Leu Ile Ile Thr Pro Gly Asp Pro Arg Leu Val Ile Ser Ser  
20 25 30

Gly Cys Ala Thr Arg Leu Phe Glu Ala Leu Glu Val Gly Ala Val Pro  
 35 40 45  
 5 Val Val Leu Gly Glu Gln Val Gln Leu Pro Tyr Gln Asp Met Leu Gln  
 50 55 60  
 Trp Asn Glu Ala Ala Leu Val Val Pro Lys Pro Arg Val Thr Glu Val  
 65 70 75 80  
 10 His Phe Leu Leu Arg Ser Leu Ser Asp Ser Asp Leu Leu Ala Met Arg  
 85 90 95  
 Arg Gln Gly Arg Phe Leu Trp Glu Thr Tyr Phe Pro Thr Ala Asp Ser  
 100 105 110  
 15 Ile Phe Asn Thr Val Leu Ala Met Ile Arg Thr Arg Ile  
 115 120 125

## (2) INFORMATION FOR SEQ ID NO:6:

20 (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 120 amino acids  
 (B) TYPE: amino acid  
 (C) STRANDEDNESS: single  
 25 (D) TOPOLOGY: linear  
 (ii) MOLECULE TYPE: protein

30 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:6:

35 Arg Cys His Lys His Gln Val Phe Asp Tyr Pro Gln Val Leu Gln Glu  
 1 5 10 15  
 Ala Thr Phe Cys Val Val Leu Arg Gly Ala Arg Leu Gly Gln Ala Val  
 20 25 30  
 40 Leu Ser Asp Val Leu Gln Ala Gly Cys Val Pro Val Val Ile Ala Asp  
 35 40 45  
 Ser Tyr Ile Leu Pro Phe Ser Glu Val Leu Asp Trp Lys Arg Ala Ser  
 50 55 60  
 45 Val Val Val Pro Glu Glu Lys Met Ser Asp Val Tyr Ser Ile Leu Gln  
 65 70 75 80  
 50 Ser Ile Pro Gln Arg Gln Ile Glu Glu Met Gln Arg Gln Ala Arg Trp  
 85 90 95  
 Phe Trp Glu Ala Tyr Phe Gln Ser Ile Lys Ala Ile Ala Leu Ala Thr  
 100 105 110  
 55 Leu Gln Ile Ile Asn Asp Arg Ile  
 115 120

## (2) INFORMATION FOR SEQ ID NO:7:

60 (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 124 amino acids  
 (B) TYPE: amino acid  
 (C) STRANDEDNESS: single

TESTED: 02550860

(ii) MOLECULE TYPE: protein

5

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:7:

|    |           |           |            |            |           |           |           |            |            |           |           |           |           |            |           |           |
|----|-----------|-----------|------------|------------|-----------|-----------|-----------|------------|------------|-----------|-----------|-----------|-----------|------------|-----------|-----------|
| 10 | Arg<br>1  | Cys       | Asp        | Arg        | Asp<br>5  | Asn       | Thr       | Glu        | Tyr        | Glu<br>10 | Lys       | Tyr       | Asp       | Tyr        | Arg<br>15 | Glu       |
|    | Met       | Leu       | His        | Asn<br>20  | Ala       | Thr       | Phe       | Cys        | Leu<br>25  | Val       | Pro       | Arg       | Gly       | Arg<br>30  | Arg       | Leu       |
| 15 | Gly       | Ser       | Phe<br>35  | Arg        | Phe       | Leu       | Glu       | Ala<br>40  | Leu        | Gln       | Ala       | Ala       | Cys<br>45 | Val        | Pro       | Val       |
|    | Met       | Leu<br>50 | Ser        | Asn        | Gly       | Trp       | Glu<br>55 | Leu        | Pro        | Phe       | Ser       | Glu<br>60 | Val       | Ile        | Asn       | Trp       |
| 20 | Asn<br>65 | Gln       | Ala        | Ala        | Val       | Ile<br>70 | Gly       | Asp        | Glu        | Arg       | Leu<br>75 | Leu       | Leu       | Gln        | Ile       | Pro<br>80 |
|    | Ser       | Thr       | Ile        | Arg        | Ser<br>85 | Ile       | His       | Gln        | Asp        | Lys<br>90 | Ile       | Leu       | Ala       | Leu        | Arg<br>95 | Gln       |
| 25 | Gln       | Thr       | Gln        | Phe<br>100 | Leu       | Trp       | Glu       | Ala        | Tyr<br>105 | Phe       | Ser       | Ser       | Val       | Glu<br>110 | Lys       | Ile       |
| 30 | Val       | Leu       | Thr<br>115 | Thr        | Leu       | Glu       | Ile       | Ile<br>120 | Gln        | Asp       | Arg       | Ile       |           |            |           |           |

(2) INFORMATION FOR SEQ ID NO:8:

35

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 123 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

45

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:8:

|    |           |           |           |     |          |           |           |           |           |           |           |           |           |           |           |           |
|----|-----------|-----------|-----------|-----|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 50 | Arg<br>1  | Cys       | Glu       | Gln | Asp<br>5 | Pro       | Gly       | Pro       | Gly       | Gln<br>10 | Thr       | Gln       | Arg       | Gln       | Glu<br>15 | Thr       |
|    | Leu       | Pro       | Asn<br>20 | Ala | Thr      | Phe       | Cys       | Leu       | Ile<br>25 | Ser       | Gly       | His       | Arg       | Pro<br>30 | Glu       | Ala       |
| 55 | Ala       | Ser       | Arg<br>35 | Phe | Leu      | Gln       | Ala       | Leu<br>40 | Gln       | Ala       | Gly       | Cys       | Ile<br>45 | Pro       | Val       | Leu       |
|    | Leu       | Ser<br>50 | Pro       | Arg | Trp      | Glu       | Leu<br>55 | Pro       | Phe       | Ser       | Glu       | Val<br>60 | Ile       | Asp       | Trp       | Thr       |
| 60 | Lys<br>65 | Ala       | Ala       | Ile | Val      | Ala<br>70 | Asp       | Glu       | Arg       | Leu       | Pro<br>75 | Leu       | Gln       | Val       | Leu       | Ala<br>80 |

Ala Leu Gln Glu Met Ser Pro Ala Arg Val Leu Ala Leu Arg Gln Gln  
                             85                            90                            95  
 5 Thr Gln Phe Leu Trp Asp Ala Tyr Phe Ser Ser Val Glu Lys Val Ile  
                             100                            105                            110  
 His Thr Thr Leu Glu Val Ile Gln Asp Arg Ile  
                             115                            120

## 10(2) INFORMATION FOR SEQ ID NO:9:

- (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 121 amino acids  
 (B) TYPE: amino acid  
 (C) STRANDEDNESS: single  
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:9:

25 Lys Cys Ser Gln Glu Asn Cys Ser Leu Glu Arg Arg Arg Gln Leu Ile  
     1                            5                            10                            15  
 Gly Ser Ser Thr Phe Cys Phe Leu Leu Pro Ser Glu Met Phe Phe Gln  
                             20                            25                            30  
 30 Asp Phe Leu Ser Ser Leu Gln Leu Gly Cys Ile Pro Ile Leu Leu Ser  
                             35                            40                            45  
 35 Asn Ser Gln Leu Leu Pro Phe Gln Asp Leu Ile Asp Trp Arg Arg Ala  
     50                            55                            60  
 Thr Tyr Arg Leu Pro Leu Ala Arg Leu Pro Glu Ala His Phe Ile Val  
     65                            70                            75                            80  
 40 Gln Ser Phe Glu Ile Ser Asp Ile Ile Glu Met Arg Arg Val Gly Arg  
                             85                            90                            95  
 Leu Phe Tyr Glu Thr Tyr Leu Ala Asp Arg His Leu Leu Ala Arg Ser  
                             100                            105                            110  
 45 Leu Leu Ala Ala Leu Arg Tyr Lys Leu  
                             115                            120

## (2) INFORMATION FOR SEQ ID NO:10:

- (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 262 amino acids  
 (B) TYPE: amino acid  
 (C) STRANDEDNESS: single  
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:10:

(2) INFORMATION FOR SEQ ID NO:11:

60 (ii) MOLECULE TYPE: protein

|    |            |            |            |            |            |     |            |            |            |            |            |            |            |            |            |            |
|----|------------|------------|------------|------------|------------|-----|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 5  | Pro<br>1   | Gln        | Ser        | Gln<br>5   | Gly        | Phe | Thr        | Gln        | Ile        | Val<br>10  | Leu        | Thr        | Tyr        | Asp        | Arg<br>15  | Val        |
|    | Glu        | Ser        | Leu        | Phe<br>20  | Arg        | Val | Ile        | Thr        | Glu<br>25  | Val        | Ser        | Lys        | Val        | Pro<br>30  | Ser        | Leu        |
| 10 | Ser        | Lys        | Leu<br>35  | Leu        | Val        | Val | Trp        | Asn<br>40  | Asn        | Gln        | Asn        | Lys        | Asn<br>45  | Pro        | Pro        | Glu        |
|    | Asp        | Ser<br>50  | Leu        | Trp        | Pro        | Lys | Ile<br>55  | Arg        | Val        | Pro        | Leu        | Lys<br>60  | Val        | Val        | Arg        | Thr        |
| 15 | Ala<br>65  | Glu        | Asn        | Lys        | Leu<br>70  | Ser | Asn        | Arg        | Phe        | Phe        | Pro<br>75  | Tyr        | Asp        | Glu        | Ile        | Glu<br>80  |
|    | Thr        | Glu        | Ala        | Val<br>85  | Leu        | Ala | Ile        | Asp        | Asp        | Asp<br>90  | Ile        | Ile        | Met        | Leu        | Thr<br>95  | Ser        |
| 20 | Asp        | Glu        | Leu        | Gln<br>100 | Phe        | Gly | Tyr        | Glu        | Val<br>105 | Trp        | Arg        | Glu        | Phe        | Pro<br>110 | Asp        | Arg        |
| 25 | Leu        | Val        | Gly<br>115 | Tyr        | Pro        | Gly | Arg        | Leu<br>120 | His        | Leu        | Trp        | Asp        | His<br>125 | Glu        | Ala        | Met        |
|    | Asn        | Lys<br>130 | Trp        | Lys        | Tyr        | Glu | Ser<br>135 | Glu        | Trp        | Thr        | Asn        | Glu<br>140 | Val        | Ser        | Met        | Val        |
| 30 | Leu<br>145 | Thr        | Gly        | Ala        | Ala<br>150 | Phe | Tyr        | His        | Lys        | Tyr        | Phe<br>155 | Asn        | Tyr        | Leu        | Tyr        | Thr<br>160 |
|    | Lys        | Met        | Pro        | Gly        | Asp<br>165 | Ile | Lys        | Asn        | Trp        | Val<br>170 | Asp        | Ala        | His        | Met        | Asn<br>175 | Cys        |
| 35 | Tyr        | Glu        | Asp        | Ile<br>180 | Ala        | Met | Asn        | Phe        | Leu<br>185 | Val        | Ala        | Asn        | Val        | Thr<br>190 | Gly        | Lys        |
| 40 | Ala        | Val        | Ile<br>195 | Lys        | Val        | Thr | Pro        | Arg<br>200 | Lys        | Lys        | Phe        | Lys        | Cys<br>205 | Pro        | Glu        | Cys        |
|    | Thr<br>210 | Ala        | Ile        | Asp        | Gly        | Leu | Ser<br>215 | Leu        | Asp        | Gln        | Thr        | His<br>220 | Met        | Val        | Glu        | Arg        |
| 45 | Ser<br>225 | Glu        | Cys        | Ile        | Asn<br>230 | Lys | Phe        | Ala        | Ser        | Val        | Phe<br>235 | Gly        | Thr        | Met        | Pro        | Leu<br>240 |
|    | Lys        | Val        | Val        | Glu        | His<br>245 | Arg | Ala        | Asp        | Pro        | Val<br>250 | Leu        | Tyr        | Lys        | Asp        | Asp<br>255 | Phe        |
| 50 | Pro        | Glu        | Lys        | Leu<br>260 | Lys        | Ser | Phe        | Pro        | Asn<br>265 | Ile        | Gly        | Ser        | Leu        |            |            |            |

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60 (A) LENGTH: 270 amino acids  
(B) TYPE: amino acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

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|    |            |            |            |            |            |           |            |            |            |            |            |            |            |            |            |            |
|----|------------|------------|------------|------------|------------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 5  | Pro<br>1   | Pro        | Ser        | Lys        | Phe<br>5   | Thr       | Ala        | Val        | Ile        | His<br>10  | Ala        | Val        | Thr        | Pro        | Leu        | Val        |
|    | Ser        | Gln        | Ser        | Gln<br>20  | Pro        | Val       | Leu        | Lys        | Leu<br>25  | Leu        | Val        | Ala        | Ala        | Ala<br>30  | Lys        | Ser        |
| 10 | Gln        | Tyr        | Cys<br>35  | Ala        | Gln        | Ile       | Ile        | Val<br>40  | Leu        | Trp        | Asn        | Cys        | Asp<br>45  | Lys        | Pro        | Leu        |
|    | Pro<br>50  | Ala        | Lys        | His        | Arg        | Trp<br>55 | Pro        | Ala        | Thr        | Ala        | Val        | Pro<br>60  | Val        | Val        | Val        | Ile        |
| 15 | Glu<br>65  | Gly        | Glu        | Ser        | Lys<br>70  | Val       | Met        | Ser        | Ser        | Arg        | Phe<br>75  | Leu        | Pro        | Tyr        | Asp        | Asn<br>80  |
| 20 | Ile        | Ile        | Thr        | Asp<br>85  | Ala        | Val       | Leu        | Ser        | Leu<br>90  | Asp        | Glu        | Asp        | Thr        | Val<br>95  | Leu        | Ser        |
|    | Thr        | Thr        | Glu<br>100 | Val        | Asp        | Phe       | Ala        | Phe        | Thr<br>105 | Val        | Trp        | Gln        | Ser        | Phe<br>110 | Pro        | Glu        |
| 25 | Arg        | Ile<br>115 | Val        | Gly        | Tyr        | Pro       | Ala        | Arg<br>120 | Ser        | His        | Phe        | Trp        | Asp<br>125 | Asn        | Ser        | Lys        |
|    | Glu<br>130 | Arg        | Trp        | Gly        | Tyr        | Thr       | Ser<br>135 | Lys        | Trp        | Thr        | Asn        | Asp<br>140 | Tyr        | Ser        | Met        | Val        |
| 30 | Leu<br>145 | Thr        | Gly        | Ala        | Ala<br>150 | Ile       | Tyr        | His        | Lys        | Tyr        | Tyr<br>155 | His        | Tyr        | Leu        | Tyr        | Ser<br>160 |
| 35 | His        | Tyr        | Leu        | Pro<br>165 | Ala        | Ser       | Leu        | Lys        | Asn<br>170 | Met        | Val        | Asp        | Gln        | Leu<br>175 | Ala        | Asn        |
|    | Cys        | Glu        | Asp<br>180 | Ile        | Leu        | Met       | Asn        | Phe<br>185 | Leu        | Val        | Ser        | Ala        | Val        | Thr<br>190 | Lys        | Leu        |
| 40 | Pro        | Pro<br>195 | Ile        | Lys        | Val        | Thr       | Gln<br>200 | Lys        | Lys        | Gln        | Tyr        | Lys<br>205 | Glu        | Thr        | Met        | Met        |
|    | Gly<br>210 | Gln        | Thr        | Ser        | Arg        | Ala       | Ser<br>215 | Arg        | Trp        | Ala        | Asp        | Pro<br>220 | Asp        | His        | Phe        | Ala        |
| 45 | Gln<br>225 | Arg        | Gln        | Ser        | Cys<br>230 | Met       | Asn        | Thr        | Phe        | Ala        | Ser<br>235 | Trp        | Phe        | Gly        | Tyr        | Met<br>240 |
| 50 | Pro        | Leu        | Ile        | His<br>245 | Ser        | Gln       | Met        | Arg        | Leu        | Asp<br>250 | Pro        | Val        | Leu        | Lys        | Asp<br>255 | Gln        |
|    | Val        | Ser        | Ile<br>260 | Leu        | Arg        | Lys       | Lys        | Tyr        | Arg<br>265 | Asp        | Ile        | Glu        | Arg        | Leu<br>270 |            |            |

60 (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 262 amino acids  
 (B) TYPE: amino acid  
 (C) STRANDEDNESS: single  
 (D) TOPOLOGY: linear

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(2) INFORMATION FOR SEQ ID NO:14:

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(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 270 amino acids

(B) TYPE: amino acid



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(2) INFORMATION FOR SEQ ID NO:15:

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(C) STRANDEDNESS: single

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:15:

Lys Tyr Val

## (2) INFORMATION FOR SEQ ID NO:16:

- 5 (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 22 base pairs  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear
- 10 (ii) MOLECULE TYPE: DNA (genomic)

- 15 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:16:

TTATGGCGAG TGACCCGACG TG

22

## 20 (2) INFORMATION FOR SEQ ID NO:17:

- (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 22 base pairs  
    (B) TYPE: nucleic acid  
25 (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: DNA (genomic)

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- (xi) SEQUENCE DESCRIPTION: SEQ ID NO:17:

35TTGCTAAAGT GAAGGAAGTT GG

22

## (2) INFORMATION FOR SEQ ID NO:18:

- 40 (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 16 base pairs  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear
- 45 (ii) MOLECULE TYPE: DNA (genomic)

- 50 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:18:

ACCCGACGTG ATCTGG

16

## (2) INFORMATION FOR SEQ ID NO:19:

- 55 (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18 base pairs  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
60 (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:19:

5AAGAGCTCCT GCAGCTGG

18

(2) INFORMATION FOR SEQ ID NO:20:

(i) SEQUENCE CHARACTERISTICS:

- 10 (A) LENGTH: 18 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

15 (ii) MOLECULE TYPE: DNA (genomic)

20 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:20:

TTCTCGTTGC CCTCTCAC

18

(2) INFORMATION FOR SEQ ID NO:21:

(i) SEQUENCE CHARACTERISTICS:

- 25 (A) LENGTH: 17 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
30 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO:21:

ATCATCAATC TGTCACG

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(2) INFORMATION FOR SEQ ID NO:22:

(i) SEQUENCE CHARACTERISTICS:

- 45 (A) LENGTH: 17 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO:22:

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ACTACGATGA CCGGATC

17

(2) INFORMATION FOR SEQ ID NO:23:

(i) SEQUENCE CHARACTERISTICS:

- 60 (A) LENGTH: 18 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single

"02660860" 0909920

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:23:

18

(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 16 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

AACATGGCTG ACAACG

16

(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 18 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:25:

TATTGGTGGT GGAGCTGG

18

(2) INFORMATION FOR SEQ ID NO:26:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 22 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:26:

AATCCAGCCA TGGTCTCCTT GG

22

(2) INFORMATION FOR SEQ ID NO:27:

(i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 22 base pairs  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: single  
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:27:

AGTCGATGCC ATTATTACCA GC

(2) INFORMATION FOR SEQ ID NO:28:

(i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 17 base pairs  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: single  
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:28:

TTCCTTCCTC ATCACAG

(2) INFORMATION FOR SEQ ID NO:29:

(i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 21 base pairs  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: single  
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:29:

AGGTCTGTGT ATGCACTTGT G

(2) INFORMATION FOR SEQ ID NO:30:

(i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 22 base pairs  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: single  
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:30:

AGTCGATGCC ATTATTACCA GC

22

(2) INFORMATION FOR SEQ ID NO:31:

- 5 (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 17 base pairs  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: single  
 (D) TOPOLOGY: linear

10 (ii) MOLECULE TYPE: DNA (genomic)

15 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:31:

TTCAAGGGTG TGGAGAG

17

20 (2) INFORMATION FOR SEQ ID NO:32:

- (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 22 base pairs  
 (B) TYPE: nucleic acid  
 25 (C) STRANDEDNESS: single  
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO:32:

35 TTGGCTGAAA GCCAACAACC TG

22

(2) INFORMATION FOR SEQ ID NO:33:

- 40 (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 20 base pairs  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: single  
 (D) TOPOLOGY: linear

45 (ii) MOLECULE TYPE: DNA (genomic)

50 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:33:

AACATGCACG CATCCACAGC

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(2) INFORMATION FOR SEQ ID NO:34:

- 55 (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 18 base pairs  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: single  
 60 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

T09T09"02660360

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:34:

5TTGTAAACACA GCATGTGG

18

(2) INFORMATION FOR SEQ ID NO:35:

10 (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 22 base pairs  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: single  
 (D) TOPOLOGY: linear

15 (ii) MOLECULE TYPE: DNA (genomic)

20 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:35:

GGTTCTGTCA GTATTAGCTG GG

22

(2) INFORMATION FOR SEQ ID NO:36:

25 (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 21 base pairs  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: single  
 30 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO:36:

TTCCTCCCTC TGCTCATCCT C

21

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(2) INFORMATION FOR SEQ ID NO:37:

(i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 17 base pairs  
 45 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: single  
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO:37:

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TTCCCACTCT GTCTCTC

17

T09T0"02660000